

CHAPTER 102. EVALUATE A PART 133 CONGESTED AREA PLAN (CAP)

SECTION 1. BACKGROUND

1. PROGRAM TRACKING AND REPORTING SUBSYSTEM (PTRS) ACTIVITY CODE. 1332

2. OBJECTIVE. The objective of this task is to determine if a CAP meets all regulatory and safety requirements. Successful completion of this task results in either approval or disapproval of a CAP.

3. GENERAL.

A. Authority. Title 14 of the Code of Federal Regulations (14 CFR) part 133, § 133.33(d)(1)(2) permits an operator to conduct external-load operations over congested areas provided the operator does so without creating undue hazard to persons or property. Each flight must be conducted on a route and at an altitude that will allow a jettisonable load to be released and the helicopter to be landed safely if an emergency arises. (Reference paragraph C(8).) Title 14 CFR § 133.33(d)(1) requires the operator to develop a plan for each operation in a congested area. The plan must be approved by the Flight Standards District Office (FSDO) having jurisdiction over the area in which the operation will be conducted.

B. Background. The Federal Aviation Administration (FAA) has determined that external-load operations are in the public interest and do not inherently pose an undue risk to the public. Hazards are prevented by risk management procedures such as a CAP, and by frequent surveillance. Title 14 CFR § 133.33(d)(1) describes the information that must be included in a CAP.

C. Definitions. For the purpose of operations conducted under 14 CFR part 133 the following definitions apply:

(1) Without Hazard. This means to operate without undue hazard beyond the risk posed by other aircraft operations to nonparticipating public or property. The nonparticipating public is expected to be protected from all the potential hazards associated with external-load operations. Property should be protected as much as possible. Potential hazard to property alone should not preclude conducting an external-load operation in accordance with a CAP.

(2) Congested Areas vs. Densely Populated Areas. These two terms are used in reference to rotorcraft external-load operations. Although the terms describe similar areas, the meanings are different. The regulations require preparation of a CAP for congested areas. A CAP is also needed for densely populated areas. In addition, an uncongested, sparsely populated area may need a CAP because the area may quickly become congested with persons watching an external-load operation.

(a) Congested Area. The congested nature of an area is defined by what exists on the surface, not the size of the area. While the presence of the nonparticipating public is the most important determination of congested, the area may also be congested with structures or objects. An area considered congested for airplane operations could be equally congested for helicopters. If an airplane flying over a congested area at less than 1,000 feet above ground level (AGL) is in violation of 14 CFR § 91.119(b), the area may also be a congested area for a helicopter conducting external-load operations. However, the most important word in this concept is over. Helicopters can operate over relatively small uncongested areas because of their maneuvering abilities.

(b) Densely Populated Area. Title 14 CFR §§ 91.313 and 133.45(d) use the term “densely populated” area. Those areas of a city, town, or settlement that contain a large number of occupied homes, factories, stores, schools, and other structures are considered densely populated. Additionally, a densely populated area may not contain any buildings but could consist of a large gathering of persons on a beach, at an airshow, at a ball game, or at a fairground.

NOTE: While the presence of the nonparticipating public is the most important determination of congested, this definition also applies to structures, buildings and personal property. The congested nature of an area is defined by what exists on the surface, not the size of the area.

(3) *Operational Area.* An area unoccupied on the surface by the nonparticipating public. The operational area is not part of the operation, but persons within this area could be injured, or property could be damaged by the external-load, or by the attaching means (load, cables, hooks, etc.).

(4) *Congested Area Plan.* The CAP is a risk management document. It is used to show that the risk associated with an external-load operation will not create undue hazards to property and the nonparticipating public because of certain, specific procedures used by the operator during the operation.

(5) *Contractor.* The person, corporation, or entity who hired an operator to conduct the external-load operation.

(6) *Appropriate Political Subdivision.* This term describes local officials who may exercise the authority to exclude persons and property from an area. These officials include the county sheriff, city police department, highway patrol, fire department, or security guards acting for the political subdivision. In many cases local police will monitor an external-load operation but will require the operator to supply sufficient personnel to exclude persons and property from the lift area.

(7) *Emergency Landing Site.* Title 14 CFR § 133.33(d)(2) requires the rotorcraft to be at an altitude that allows landing in an emergency without hazard to persons or property on the surface. There is no requirement that the emergency landing be made without damage to the rotorcraft. An emergency landing site does not have to be an improved surface. The parking lot at the pickup site or a roof top at the set site are examples of emergency landing sites.

(8) *Near a Busy Airport Where Passenger Transport Operations are Conducted.* An external-load operation conducted within Class D airspace could be considered near a busy airport under 14 CFR § 133.45(d). External-load operations with restricted category rotorcraft may not be conducted within such an area when passenger transport operations (air carrier and air taxi) are being conducted. The operator should be advised that advance coordination with the Air Traffic Control (ATC) facility is necessary to ensure the establishment of the proposed hours of external-load operation. The external-load operators using restricted category rotorcraft must show that adequate procedures exist to ensure that no external-load operation is conducted when passenger transport

operations are in progress. Passenger transport operations are considered in progress whenever an aircraft engaged in these operations is in flight within the above defined areas and the operator is so advised by ATC.

D. Authorization Limitations of 14 CFR § 21.25.

(1) Section 133.33(d), Operating Rules, provides for the approval of a congested area plan for the conduct of external-load operations by aircraft certificated under and meeting the requirements of 14 CFR part 27 or 29. Section 133.33(d) does not provide for the approval of a congested area plan for the purpose of conducting external-load operations by aircraft certificated under and meeting the requirements of 14 CFR § 21.25.

(2) Section 91.313(e), Restricted Category Civil Aircraft: Operating Limitations, prohibits any operation of aircraft certificated under 14 CFR § 21.25 from operating over densely populated areas, on a congested airway, or near airports where passenger transport operations are conducted unless operating limitations have been issued to permit such operations or a waiver to the rule has been issued by the geographically responsible FSDO in accordance with 14 CFR § 91.905.

(3) Section 133.45(d), Operating Limitations, prohibits external-load operations by rotorcraft certificated under 14 CFR § 21.25 over densely populated areas, on congested airways, or near airports where passenger transport operations are being conducted, and waivers are **not** authorized. These prohibitions remain in place and are not under consideration for change.

E. Contingency Plans.

Section 133.33(d)(1) defines a CAP, and describes the information that must be presented in such a plan. The rule provides only for the formulation of a CAP for external-load operations conducted over congested areas by operators of aircraft certificated under part 27 or 29. For operations over other than congested areas, operators may be required to develop a contingency plan (other than a CAP) to prevent the area from becoming congested.

(1) Restricted category aircraft may be flown over congested areas to the load site when operating in accordance with the terms and conditions of a certificate of waiver or special operating limitations issued by the local FSDO in accordance with 14 CFR part 91, § 91.313(e).

(2) If the external-load lift site is determined to be other than a congested area, is made sterile (non-participating personnel removed from the site), and no airport or airway incursions occur, a helicopter **not** type certificated under 14 CFR part 27 or 29 may conduct an external load operation. However, a contingency plan (not a CAP) may be necessary to determine that the operator has considered areas for load jettisoning, emergency landings, ingress and egress routes, and means for maintaining a sterile area. This last item is most important since the mere presence of a helicopter conducting an external-load operation is likely to draw spectators and other unnecessary personnel to the scene, to the extent that the area may become congested.

(3) If the external-load lift site is determined to be other than a congested area, operators of rotorcraft certificated under part 27 or 29 may be required to develop a contingency plan that includes the provisions for a CAP in the event the lift area becomes congested.

F. Restricted Category Rotorcraft. Title 14 CFR part 133 provides that a rotorcraft external-load operator may conduct operations over congested areas only in a rotorcraft type certificated under and meeting the requirements of parts 27 and 29 (normal and transport category rotorcraft). Restricted category rotorcraft certificated in accordance with part 21 do not necessarily meet airworthiness requirements for parts 27 and 29. Therefore, in order to maintain an equivalent level of safety, restricted category rotorcraft shall not be used in external-load operations:

- (1) Over congested or densely populated areas.
- (2) In congested airways, or near a busy airport where passenger transport operations are conducted.

NOTE: An operator performing external-load operations using restricted category rotorcraft over an uncongested area must ensure that the area being utilized remains uncongested for the duration of the operation. In addition, the external-load operator using restricted category rotorcraft near a busy airport must show that adequate procedures exist to ensure that no external-load operation is conducted when passenger transport operations are in progress. (An external-load operation conducted within Class D airspace could be considered near a busy airport under 14 CFR § 133.45(d)). The operator should be advised that advance coordination is required with the ATC facility having jurisdiction over the airport.

dination is required with the ATC facility having jurisdiction over the airport.

G. Evaluation of the CAP. For each operation, the certificate holder is required to submit a plan that must be approved by the FSDO having jurisdiction over the area in which the operation will be conducted. A separate plan is not necessary for each flight. One plan may suffice for an operation that requires several flights or even days to complete. Plans vary widely and it is up to the inspector to consider all situations that may arise.

H. Qualifications of the Inspector Evaluating the Plan. Whenever possible, CAP's should be reviewed by an Inspector with experience as an external-load helicopter pilot. If a FSDO does not have an inspector with this experience, the best qualified operations inspector will be designated by the office manager.

I. The Concept of Risk Management in External-Load Operations. It is unreasonable to expect the plan or the inspector to foresee every unlikely eventuality, including crash forces or scatter patterns. A helicopter crash that occurs during a low speed, low altitude external-load operation may produce less crash forces than another helicopter without an external-load that impacts with 120 knots forward speed. Consequently, both the operator and the inspector must weigh all the alternatives and carefully make decisions that would not unduly restrict external-load operations that are clearly in the public interest. The operator is responsible for developing a plan that minimizes manageable risk.

(1) Identification of rotorcraft is used to verify that a particular helicopter is on the List of Authorized Rotorcraft.

(2) Identification of rotorcraft airworthiness category is used to determine whether the operator plans to use restricted category helicopters. The inspector should also determine if the area of the proposed operation is a congested area. (See paragraph 3D.)

(3) It is necessary to include the dates and times of the proposed operation. This enables the Inspector to evaluate the exclusion of unauthorized persons from the operational area by local authorities and/or the operator. It also provides the inspector with the opportunity to schedule surveillance during the operation.

(4) The name, phone number, and title of the official of the local political subdivision should be provided, when appropriate.

(5) When evaluating the plan, the inspector should consider the weight, shape, and aerodynamic flight characteristics of the load.

(6) The inspector needs to know the proposed length of cable to determine if the plan provides for an adequate operational area.

(7) The operator should estimate how many floors the load, with attaching means, could penetrate if dropped from the highest point that it will be lifted above the building. The type of roof construction and the size, shape and weight of the load must be taken into account. The plan should require that one additional floor beyond those estimated to be penetrable be unoccupied. On a tiered building, the height the load will be lifted above each tier will determine the number of floors in the respective tiers that must be unoccupied (figure 102-2).

(8) The Inspector should be provided with phone numbers to contact the building owner and/or manager for verification that the building will actually be unoccupied during the operation. Exclusion of persons includes after-hours personnel such as building maintenance workers.

(9) Aeronautical charts alone often do not provide sufficient detail for depicting routes and altitudes over a congested area. City maps or even hand drawn charts may be necessary. Hand drawn charts should be drawn to approximate scale. Topographical maps, charts and aerial photographs should be as current as possible to assure an accurate representation of the area.

(10) When available, photographs of the lift site, set site and surrounding areas can also be an asset to the inspector. If the CAP is in an area unfamiliar to the inspector, the addition of these photographs can greatly reduce the amount of time needed to approve the CAP.

NOTE: Each external-load operation is unique. The risk to the nonparticipating public dictates operational area requirements. It must be emphasized that the following criteria are guidelines and the inspector may exceed or reduce them as appropriate.

J. Criteria 1, Normal Loads. For non-aerodynamic loads, such as air conditioning units and flag poles flown below effective translational lift (ETL), the radius of the operational area should be at least 1.5 times the overall length (including rotor discs) of the helicopter used, or the length of the external-load including the attaching means (cable, etc.), whichever is greater. (figure 102-3) When operating along a route above ETL, the operational area should extend at least 45 degrees in front of the rotorcraft. For example, if the rotorcraft (not load) will be operated at 300 feet above the surface, the operational area should extend at least 300 feet in front of the rotorcraft. The forward radius should not extend less than three times the overall length of the helicopter (figure 102-4).

K. Criteria 2, Aerodynamically Shaped Loads. For aerodynamic loads, use whichever is greater: Criteria 1 (paragraph 3I) or paragraph 3J, Criteria 2. In Criteria 2, the criteria applied to aerodynamic loads provides for about 45 degrees of drift after the load is released. If the load is lifted 200 feet high, the operational area radius should be 200 feet. The method of calculation that provides for the greatest operational area should be used. For example, a helicopter will transport an aerodynamically shaped load along a congested area route. The higher the load is lifted above the surface, the wider the operational area must be to accommodate release of the load. Conversely, operating the rotorcraft at a higher altitude provides more options for landing in an emergency. Generally, the plan should provide for operating the rotorcraft at an altitude high enough to permit landing in an emergency, but hold the load low enough to ensure that the external-load will land within the operational area if it is released. (figure 102-5)

L. Conditions of Approval. The inspector may find it necessary to specify conditions of approval for a plan. These contingencies may be based on the inspector's experience monitoring similar plans or experience with this operator. The inspector may approve the plan in principle provided the operator complies with the written contingencies the inspector notes on the plan.

M. Coordination with Appropriate Officials. Local officials should exclude unauthorized persons from the site if open to the public. In some cases, local officials may delegate this task to the operator, who is ultimately responsible for site security.

N. Subcontracting Work or Equipment: Responsibility for the CAP. A situation may arise when an external-load operator contracts with another external-load operator for a specific operation. For example, operator A's helicopter can lift only a certain weight that is less than the weight of the load to be lifted. Operator B has a large helicopter that can lift the load. In this case, operator B would have to submit the CAP because operator B is actually performing the work. If operator A wishes to conduct the external-load operation using operator B's helicopter, operator A must meet all certification requirements appropriate to adding operator B's helicopter to operator A's list of authorized rotorcraft.

O. Site Inspection. Unless the inspector has a current working knowledge of the site/route, or the operator can supply photographs of sufficient detail, an on-site survey should be made.

P. Congested Area Plan Contingencies. The CAP submitted by the operator should contain contingency plans for as many variables as possible. With approved contingencies, the operator will not have to postpone the operation to seek FAA approval if the plan must be modified.

4. MONITORING A CONGESTED AREA PLAN. Ideally, each congested area plan operation should be monitored if practicable. However, an ongoing daily operation may not require continuous monitoring. An operator unfamiliar to the FSDO or an operator working over a congested area for the first time should require an inspector's presence for the duration of the operation. The inspector may initiate emergency revocation of an operation when it is determined that an operator continues to operate contrary to the plan (see volume 2, chapter 103).

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SECTION 2. PROCEDURES

1. PREREQUISITES AND COORDINATION REQUIREMENTS.

A. Prerequisites. This task requires knowledge of the regulatory requirements of 14 CFR part 133 and FAA policies and qualification as an Aviation Safety Inspector (ASI) Operations with experience as an external-load helicopter pilot.

B. Coordination. This task requires coordination with the local officials and possibly with the operator's Certificate Holding District Office (CHDO).

2. REFERENCES, FORMS AND JOB AIDS.

A. References.

- 14 CFR parts 1, 27, 29, 61, 91, and 133
- Advisory Circular (AC) 133-1, Rotorcraft External-Load Operations in Accordance with 14 CFR Part 133
- PTRS Procedures Manual (PPM)

B. Forms.

- None

C. Job Aids.

- Sample CAP
- Tape Recorder and Camera Equipment
- Sample letters and figures

3. PROCEDURES.

A. Initial Inquiry. Upon inquiry, give applicant a sample CAP or explain what the plan must include. Indicate that a portion of the Rotorcraft-Load Combination Flight Manual (RLCFM) is reserved for CAP's.

B. PTRS. Open PTRS file.

C. Review Submitted Plan. An acceptable plan must include (but not be limited to) the following information:

- (1) The name, address, and phone number of operator;
- (2) The name, address, and phone number of contractor;
- (3) The identification number of rotorcraft (N-number);

(4) The type of aircraft (make and model) to be used and the rotorcraft airworthiness category (standard or restricted);

(5) The name of pilots involved in the congested area operation;

(6) The number of loads to be carried;

(7) A description of loads to be carried including the weight of each load;

(8) The date the operation begins, the dates of all flights, and the date the operation ends;

(9) The name and phone number of the person contacted at the Police, Sheriff, Fire Departments;

(10) The signature of person responsible for the company (usually the chief pilot);

(11) The date of submission;

(12) A copy of the written agreement with local officials for the exclusion of unauthorized persons, or the name and telephone number of the official if responsibility is delegated to the operator;

(13) A record of coordination with ATC (if applicable);

(14) A detailed chart depicting flight routes and altitudes;

(15) A diagram and narrative defining operational areas, pickup sites, delivery site, streets to be blocked and to be unoccupied by persons, and location of obstructions in the operating area;

(16) A procedure for ceasing operation if a potential or real hazard occurs;

(17) A list of all buildings to be unoccupied by persons during the lift;

(18) A list of buildings within the operational area that will be occupied by persons, as well as number of floors which shall be occupied;

(19) An estimate how many floors of the building would be penetrated if the load is released at the maximum height it will be lifted above the roof, if appropriate. The plan should provide the inspector with assurance that the load will penetrate no more than the number of floors specified in the plan;

(20) An estimate of how long the external-load attaching means will be, such as the length of the cable; and

(21) The designation of emergency landing areas at the delivery and pick up sites.

D. Verify Plan. Ensure that the operator has checked with the local political subdivisions to verify they agreed to provide security for the area and that they thoroughly understand the nature and implications of the plan.

E. Review Files. Review office files, or coordinate with the CHDO in order to review the current operating certificate to determine the class of authorization.

F. Site Inspection.

(1) Verify that the operational areas, including emergency landing sites, are adequate as described in the plan.

(2) Travel the actual route to verify that the load may be jettisoned and that the rotorcraft may be landed in an emergency.

(3) Note any discrepancies or conditions of approval.

G. Plan Satisfactory. When all requirements for the plan are met, approve it by stamping, dating, and signing each page. Make a copy of the plan for the FSDO files.

H. Plan Satisfactory with the Addition of Provisions. When all requirements have been met, but the further requirements must be made in the interest of safety, approve the plan with provisions specified in writing (figure 102-6). Make a copy of the plan and the provisions for the file.

I. Plan Unsatisfactory. Advise the operator that the plan is unsatisfactory and explain what the deficient areas are.

(1) Discuss whether to return the plan or whether the operator will amend the plan.

(2) Review resubmitted plan and reinspect the site as necessary.

J. PTRS. Close PTRS file.

4. TASK OUTCOMES. Completion of this task results in either:

A. A record in the file indicating an approved CAP, with or without contingencies; or

B. A letter to the operator outlining areas of deficiency in a CAP.

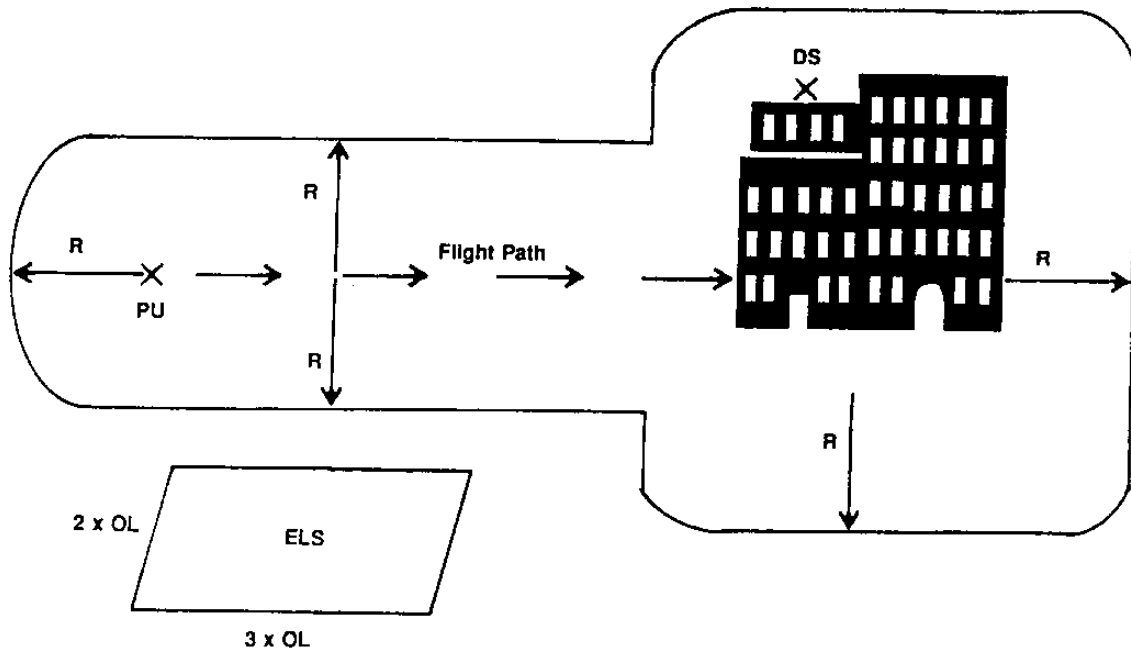
5. FUTURE ACTIVITIES. Monitor the congested area operation to ensure compliance with the approved plan.

FIGURE 102-1
OPERATIONAL AREA AROUND BUILDING AND EMERGENCY LANDING SITE

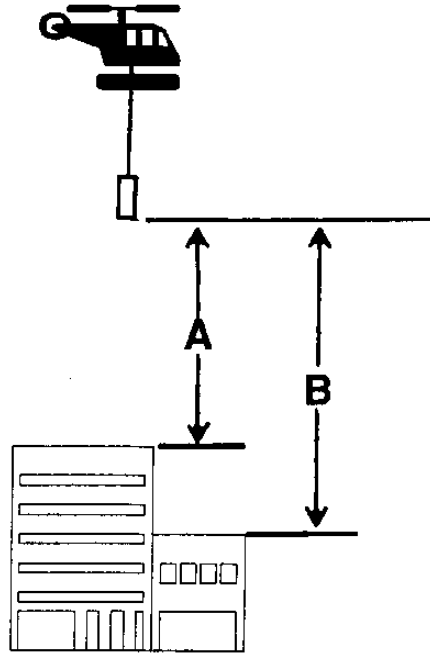
$R = 1.5 \times$ Overall length (OL) of helicopter, including rotor blades

PU = pickup site

DS = delivery site



**FIGURE 102-2
HEIGHT OF LOAD ABOVE BUILDING**



A = The maximum height that the load will be lifted above the top of the building must be specified in the plan if the building will be occupied during the operation.

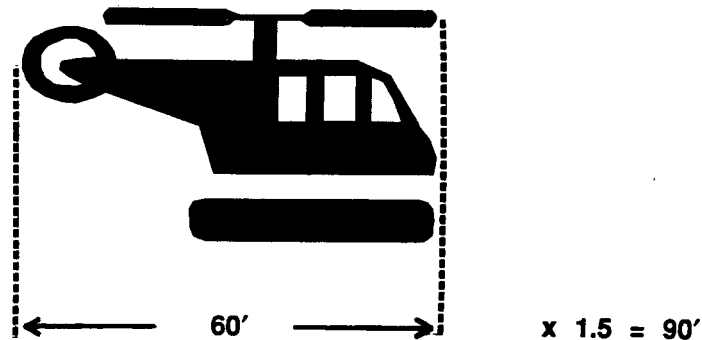
B = The maximum height that the load will be lifted above the lower tier (if applicable) must also be specified if this portion of the building will be occupied during the operation.

FIGURE 102-3
NON-AERODYNAMIC LOAD OPERATIONAL AREA

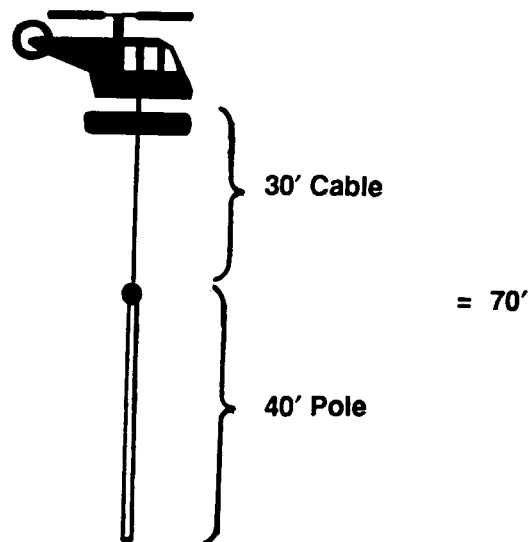
FORWARD DISTANCE BELOW ETL

RADIUS

Use the greater of: a) 1.5 x Overall length of helicopter



b) Overall length of load (including cable)

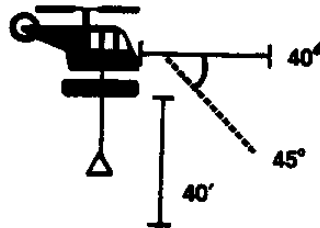


**FIGURE 102-4
NON-AERODYNAMIC LOAD OPERATIONAL AREA**

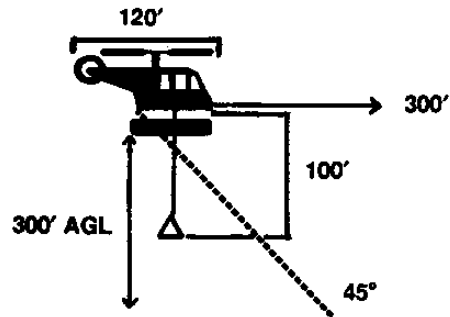
FORWARD DISTANCE ABOVE ETL

Minimum of : (But not less than 3 times overall length)

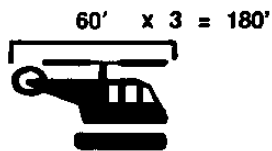
- a) 45°, If helicopter altitude less than 50' AGL



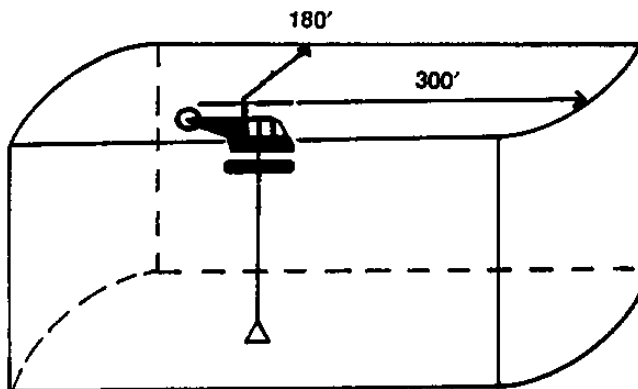
- b) Equal to rotorcraft altitude above 50' AGL



- c) 3 x Overall length of helicopter



Operational Area for the above example would equal 300' forward distance and would be depicted as:



**FIGURE 102-5
AERODYNAMIC LOAD OPERATIONAL AREA**

RADIUS AND FORWARD DISTANCE COMPUTATION ABOVE ELT

Use the greater of:

1. Non-aerodynamic load criteria

OR

2. Altitude (AGL) of aerodynamic external-load.

Using the same criteria from the non-aerodynamic load example
In Figure 102-3 and adding the following aerodynamic load,
the operational area would be depicted as:

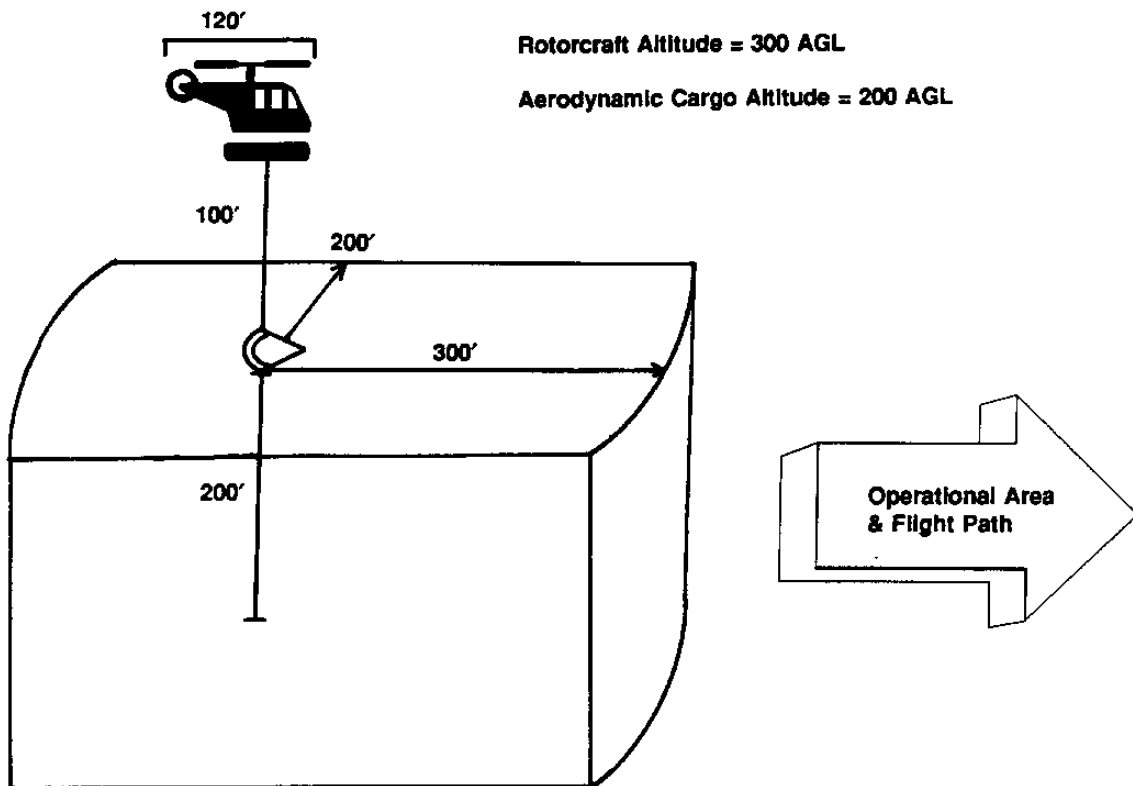


FIGURE 102-6
LETTER APPROVING CAP WITH CONTINGENCIES

FAA Letterhead

[*date*]

[*name and address of the operator*]

Dear [*name of the operator*]:

The approval of the Congested Area Plan submitted by you on [date] is confirmed.

This approval concerns the proposed operation at [*site location*] on [*date(s)*], and is contingent on [*cite contingencies as appropriate*]. Inspectors from this office will monitor the operation to ensure compliance with the approved plan.

Should you have any questions or need to submit a change to this plan, please contact this office at [*FSDO telephone number*].

Sincerely,

[*POI's signature*]